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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/903,521	07/13/2001	Satoshi Nakamura	325772024100	2646

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EXAMINER

TRAN, NHAN T

ART UNIT	PAPER NUMBER
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2615

DATE MAILED: 06/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/903,521

Applicant(s)

NAKAMURA, SATOSHI

Examiner

Nhan T. Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2, 4 and 6-28 is/are pending in the application.
- 4a) Of the above claim(s) 7-17, 21 and 22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 6 and 18-28 is/are rejected. *Note claims 21, 22 in the office Action*
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/9/2005 has been entered.

Response to Arguments

2. Applicant's arguments with respect to claims 1, 2, 4, 6 & 18-28 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

3. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered newly added claims 21 & 22 have been temporarily renumbered as claims 29 & 30 since claims 21 & 22 were withdrawn from consideration (see

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Amendment filed 8/26/2004). The Applicant is requested to renumber these newly added claims 21 & 22.

The following art rejection will be applied to newly added claims 21 and 22 as currently presented with a renumber note for these claims. Further correction to the claim numbers must be made by the Applicant.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 18-20, 21 (*renumbered* 29) & 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morris et al (US 2003/0164884 A1) in view of Wong et al (US 2003/0058355 A1) and in further view of Kubo et al (US 6,545,710).

Regarding claim 1, Morris discloses a solid-state image sensing apparatus (Fig. 13), comprising:

a solid-state image sensing device (119, Fig. 3) outputting an electrical signal proportional to an intensity of incident light, the solid-state image sensing device configured for outputting a first signal converted linearly to the intensity of the incident light and a second signal converted natural-logarithmically to the intensity of the incident light (see paragraph [0022]);

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a first signal processing circuit (i.e., a first portion of pre-processing circuit 126) supplied with the first signal from the solid-state sensing device and performing double correlated sampling processing (paragraph [0034]);

a second signal processing circuit (i.e., a second portion of pre-processing circuit 126) supplied with the second signal from the solid-state image sensing device and performing double correlated sampling processing (paragraph [0034]).

Morris does not explicitly teach a plurality of color filters provided in the solid-state image sensing device, wherein the first signal and the second signal output from the solid-state image sensing apparatus comprise a plurality of color signals. Morris neither teaches that the first and second signal processing circuits perform white balancing adjustment of the first signal and the second signal, respectively, and wherein a dynamic range of the second signal is adjusted at the second signal processing circuit thereby a contrast of the second signal is improved.

As taught by Wong in Fig. 1 and paragraph [0034], a pre-processing circuit 115 not only performs correlated double sampling and color filter array interpolation (implying that an image sensor has a plurality of color filters provided thereon) but the pre-processing circuit 115 also performs white balancing and gain control for optimizing dynamic range of the image signals.

Therefore, it would have been obvious to one of ordinary skill in the art to provide a plurality of color filters on the image sensor device (119) in a conventional configuration so as to output the first and second signals in color signals, and further to expand the first and second pre-processing circuits in Morris by incorporating white

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balancing processing, gain control processing in addition to the correlated double sampling so that the dynamic range/contrast of the output signals are enhanced.

Morris and Wong are silent about the adjustment of the dynamic range increasing a compressed range luminance distribution of the imaged subject by natural-logarithmically conversion. However, Kubo teaches a white balance adjustment is performed to increase a compressed range luminance distribution of the image subject by natural-logarithmically conversion (see Kubo, col. 3, lines 26-56; col. 7, lines 48-52; col. 8, lines 8-20 and TABLE 1 in col. 15).

Therefore, it would have been obvious to one of ordinary skill in the art to further incorporate the teaching of Kubo into the combined imaging apparatus of Morris and Wong to configure the adjustment of the dynamic range by adjusting white balance to increase a compressed range luminance distribution of the imaged subject by the natural conversion so that the image quality would be highly improved since the white balance would be performed with high accuracy (see Kubo, col. 20, lines 46-47).

Regarding claim 18, see the analysis of claim 1.

Regarding claim 19, Morris clearly discloses in paragraph [0034] that signal processing circuit further comprising: a first signal processing circuit receiving the first signal from the solid-state image sensing device and performing *at least a portion* of the first predetermined signal processing; and a second signal processing circuit receiving the second signal from the solid-state image sensing device and performing *at least a portion* of the second predetermined signal processing.

Regarding claim 20, Morris further discloses the signal processing circuit comprising a third signal processing circuit (processing circuit 148) receiving the first and second signals processed by the first and second signal processing circuits (a first portion and a second portion of signal conditioning circuits 126 including noise filtering), respectively, and performing *at least a portion* of the first and second predetermined signal processing on the first and second signals (see Fig. 13; paragraph [0037] and note that the signal processing circuit 148 is coupled to the pre-processing circuit 126 to perform a part of *further* processing of the first and second signals).

Regarding claims 21 (renumbered 29) & 24, Kubo teaches that the adjustment of the dynamic range is performed with a luminance distribution of the subject (see 3, lines 31-36; col. 14, line 59 – col. 15, line 15 and TABLE 1).

Regarding claim 25, see the analysis of claim 1.

Regarding claim 26, see the analysis of claim 21 (renumbered 29) or 24.

5. Claims 2, 4, 6, 22 (*renumbered 30*), 23, 27 & 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morris et al., Wong et al. and Kubo et al. as applied to claim 1 and in further view of D'Luna et al (US 5,008,739).

Regarding claim 2, the combination of Morris, Wong and Kubo discloses the imaging sensing apparatus having all features as analyzed in claim 1. Morris further discloses a third signal processing circuit (148) to process signals output from the first and second signal processing circuits as analyzed in claim 20.

Morris, Wong and Kubo do not disclose a logarithmic/linear conversion circuit for converting a signal output from the second signal processing (in logarithmic mode) to a signal linearly proportional to the intensity of the incident light before inputting to the third signal processing circuit. D'Luna teaches a log to linear conversion circuit to convert the logarithmic signal to a linear signal for further processing at subsequent states (i.e., black level clamping) since the subsequent processes are desirably completed in linear space, where the adjustments will be direct, linear relation to the charge signal amplitudes existing on the image sensor (see D'Luna, col. 6, lines 1-11).

Therefore, it would have been obvious to one of ordinary skill in the art to include a log to linear conversion circuit on the output of the second signal processing circuit in the combined teachings of Morris, Wong and Kubo to convert the logarithmic signal to a linear signal before outputting the signal to the third signal processing for further processing such as black clamping which would require the signal in a linear space, where the adjustments would be direct, linear relation to the charge signal amplitudes existing on the image sensor.

Regarding claim 4, both Wong and D'Luna further teach a gamma correction that would be included in the first processing circuit (for linear characteristics) and the second processing circuit (for logarithmic characteristics) for correcting gamma of the first signal

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and second signals, respectively. See Wong, paragraph [0034] and D'Luna, col. 2, lines 18-21.

Therefore, it would have been obvious to enable gamma corrections in both the first and second processing circuits in Morris in addition to the existing circuits for further improving the first and second signals.

Regarding claim 6, see the analyses of claims 1 & 2.

Regarding claims 22 (renumbered 30) & 23, see the analysis of claim 21 or 24.

Regarding claim 27, see the analysis of claim 2.

Regarding claim 28, see the analysis of claim 21 or 24.

Conclusion


6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nhan T. Tran whose telephone number is (571) 272-7371. The examiner can normally be reached on Monday - Thursday, 8:00am - 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Ometz can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

NT.



DAVID L. OMETZ
PRIMARY EXAMINER